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A B S T R A C T S

The following abstracted articles have been published in the January-December, 1962 issues of the journal.

JANUARY

Evaluation of Mobility of Hip and Lumbar Vertebrae of Normal Young Women. S. J. Clayson; I. M. Newman; D. F. Debevec; R. W. Anger; H. V. Skowlund, and F. J. Kottke. (pp. 1-8; 3 figures and 5 tables)

• A study of mobility of the hip and lumbar part of the spine of 26 normal women of college age was undertaken, to provide precise data for use in returning to function patients in whom the normal range of motion has been altered by pain, muscular weakness or contractures. The full range of motion of the hip from maximal flexion to maximal extension and the full range of flexion and extension of the lumbar spine as well as the relaxed standing position have been observed roentgenologically, and the results are summarized.

Requests for reprints and/or information should be directed to: Frederic J. Kottke, M.D., Department of Physical Medicine and Rehabilitation, University of Minnesota Medical School, Minneapolis 14, Minn.

Medical Rehabilitation and Physical Medicine in Denmark. S. M. Clemmesen. (pp. 9-15)

• The history of public and private efforts at rehabilitation in Denmark is reviewed, and the prospects for an improved program under the new legislation of 1960 are discussed. The need for training physicians and other medical workers in rehabilitation, as well as the need to nourish the resilience of disabled persons who may be tempted to let the state take care of them, is commented on.

Requests for reprints and/or information should be directed to: Svend M. Clemmesen, M.D., Chief, Department of Physical Medicine and Rheumatology, Kommunehospitalet, Copenhagen, Denmark.

Postural Factor in Paralytic Scoliosis: A Clinical, Radiologic and Electromyographic Study. K. Jansen. (pp. 16-21; 9 figures)

• The inadequate response to spine fusion and several other procedures in conjunction with observation of other clinical changes has provided the evidence that paralytic scoliosis is not merely a deformity based upon contracture of the preserved muscles of the spine. A long-term study of paralytic scoliosis with clinical and radiologic evaluation has revealed (a) that in the varying pattern of paraparesis, an imbalance of the side stabilizing trunk muscles is an almost constant finding; (b) the development of the paralytic scoliosis follows a specific course resulting in three scoliotic pictures, each pattern being related to the degree of paraparesis; (c) the scoliosis may be considered according to (a) and (b); (d) investigations of the muscle activity of the main trunk muscle groups and some observations of the correlation of muscular activity and placement of gravity center may indicate that the scoliosis is not only being adjusted to the postural needs, but just as well to the forces of gravity. Based on these facts, the concept of scoliosis should be a more dynamic one, and the treatment should respect the above-named factors. Correction of a scoliosis followed by spine fusion may disturb the postural stability of the trunk, unless some substitute for the paralyzed muscular stabilizers is provided. This concept may explain several, so far unsolved questions, e.g., the occurrence of contractures and the recurrence of scoliosis after fusion.

Requests for reprints and/or information should be directed to: Dr. Knud Jansen, Orthopaedic Hospital, Copenhagen, Denmark.

A Preliminary Report on the Use of Electronic Data Processing Techniques in the

Description and Evaluation of Disability. W. A. Spencer, and C. Vallbona. (pp. 22-35; 7 figures and 1 table)

• The impact of catastrophic illness or injury upon an individual is manifested by a complex derangement of his physiologic, psychologic and sociologic behavior. A precise estimation of the extent and composition of disability this causes should result in better planning of rehabilitation treatments and in better evaluation of their results. For the last two years initial efforts have been made to apply electronic data processing techniques to document the natural history of the disability of patients who have severe physiologic impairments. Source documents have been made of medical, sociologic and psychologic information which are collected in alphanumeric form and are then transferred to punched cards. This has allowed the streamlining of the recording and listing of routine statistical elements of the medical record, the posting in a chronologic sequence of simple nursing and medical observations, and the summarizing in a chronologic order of laboratory data and functional test data. It is anticipated that the recording and storage of this information in a digitized form will permit multiple correlation studies based on a large volume of observations pertaining to many patients. Practical examples of the use of electronic data processing in the description and evaluation of disability are presented.

Requests for reprints and/or information should be directed to: William A. Spencer, M.D., Texas Institute for Rehabilitation and Research, 1333 Moursund Ave., Houston 25, Texas.

Multiple Congenital Contractures (Arthrogryposis): An Electromyographic Study. C. A. Swinyard, and A. Magora. (pp. 36-41; 3 tables)

• Electromyographic study of the muscles of 11 patients born with multiple congenital contracture (arthrogryposis) was made. Five of the patients belonged to the same kindred. Fibrillation potentials were found in the muscles of 4 patients. Excessive polyphasic, positive sharp and giant potentials were found in 4 patients. Although it is acknowledged that there are many operative factors, which might produce intrauterine contracture, these data are supported by autopsy studies and indicate that a significant percentage of congenital contractures are secondary to disease of lower motor neurons.

Requests for reprints and/or information should be directed to: Chester A. Swinyard, Ph.D., M.D., Associate Director, Children's Division, New York University Bellevue Medical Center, Department of Physical Medicine and Rehabilitation, 400 E. 34th Street, New York 16, N. Y.

FEBRUARY

Effects of Training and Athletic Participation on Physical Performance of High School Boys. J. C. Honet; W. S. Fowler; E. C. Elkins, and C. E. Baker. (pp. 51-56; 1 figure and 2 tables)

• The effect of athletic participation, with or without progressive summer preconditioning exercise, on the physical performance of 33 high school boys was studied throughout one school year. Performance was determined as work output during maximal exercise for one minute on a bicycle ergometer; pulse rate was measured by cardiostethoscope. All subjects played interscholastic football. During preconditioning (four and a half weeks) and the football season (eleven weeks), the preconditioned group (18 boys) achieved and maintained an increased work output, and they demonstrated a decreased pulse rate (two minute postexercise pulse rate per unit work). Work output of the nonconditioned group (15 boys) decreased during the early part of the football season and increased thereafter. Additional increase of work output was achieved by both groups during succeeding periods of participation in winter and spring sports. Work output of nonathletic control sub-

jects did not increase during the year. Progressive conditioning exercise increased physical performance of boys participating in athletics.

Requests for reprints and/or information should be directed to: Joseph C. Honet, M.D., Mayo Clinic and Mayo Foundation, 1138 - 5th Avenue, S.E., Rochester, Minn.

Conduction Velocity in the Proximal and Distal Segments of the Motor Fibers of the Ulnar Nerve of Human Beings. M. H. Spiegel, and E. W. Johnson. (pp. 57-61; 7 figures)

● Measurement of conduction velocity of motor nerves was done on 38 ulnar nerves of 21 subjects, to determine the relation between the velocity in the proximal and the distal segments of motor fibers to the abductor digiti min. ni muscle. The results indicate that the velocity in the distal segments is slightly greater than that in the proximal segments. While these differences are statistically significant, we do not feel that they are of clinical importance in electrodiagnosis. The small differences may be explained by mechanical sources of error in the technic or perhaps by unknown factors. When the isolation of a muscle response is necessary, as in stimulating motor nerves when several are in close proximity, a needle electrode is helpful.

Requests for reprints and/or information should be directed to: Ernest W. Johnson, M.D., Associate Professor and Director, Division of Physical Medicine and Rehabilitation, Department of Medicine, Ohio State University Health Center, University Hospital, 410 W. 10th St., Columbus 10, Ohio.

Measurement of the Stretch Reflex Response as an Approach to the Objective Evaluation of a Spasticity. O. E. Miglietta, and M. Lowenthal. (pp. 62-68; 2 figures; 1 table, and 3 graphs)

● This paper presents a method by which an "objective" and "quantitative" assessment of spasticity is possible. Since the exaggerated stretch reflex is one of the most striking and fundamental aspects of spasticity, this was selected for study with a technic that objectively elicits, records and measures the stretch reflex. The technic and results are described. A clinical trial of a muscle relaxing medicine was made. Pre-medication recordings of muscles were made. The muscle relaxant agent was given for three weeks, after which time the stretch reflex was again recorded. The pre-medication stretch reflex amplitude varied from 100 microvolts to 2700 microvolts with an average of 878. After medication the range was 75 to 1300 microvolts with an average of 466 microvolts or an average reduction of 46.7 per cent. The authors believe that the measuring technic described provides the clinician a means by which he can compare the effectiveness of procedures proposed for the control of spasticity.

Requests for reprints and/or information should be directed to: Osvaldo E. Miglietta, M.D., Instructor, Department of Physical Medicine and Rehabilitation, New York Medical College, Flower & Fifth Avenue Hospitals, Fifth Avenue at 106th Street, New York 29, N. Y.

Comparison of Relative Heating Patterns Produced in Tissues by Exposure to Microwave Energy at Frequencies of 2,450 and 900 Megacycles. J. F. Lehmann; A. W. Guy; V. C. Johnston; G. D. Brunner, and J. W. Bell. (pp. 69-76; 8 figures)

● A study of the effects of microwaves at frequencies of 2,450 and 900 megacycles is reported. The results suggest that the application of microwaves at either frequency to an obese person will result in relatively high temperature in the subcutaneous tissues. To a person with moderate subcutaneous fat, exposure to microwaves of 900 megacycle frequency will produce the highest temperature in muscle and heat the deeper layers of muscle tissue more effectively than will exposure to 2,450 megacycle frequency microwaves. The study clarifies the need for further investigations of the effects of various microwave frequencies, to determine the most appropriate conditions and the most effective frequency for clinical application of microwave energy.

Requests for reprints and/or information should be directed to: Justus F. Lehmann, M.D., Professor,

University of Washington, Department of Physical Medicine and Rehabilitation, CC-814 University Hospital School of Medicine, Seattle, Wash.

MARCH

Highlights of Ten Years in Physical Medicine and Rehabilitation. D. A. Covalt. (pp. 91-94)

● Progress in the specialty of physical medicine and rehabilitation is reviewed, and the need to attract young general practitioners into the field is stressed. The requirements for certification by the American Board of Physical Medicine and Rehabilitation are outlined.

Requests for reprints and/or information should be directed to: Donald A Covalt, M.D., Institute of Physical Medicine and Rehabilitation, 400 E. 34th St., New York, N. Y.

Effect of Varying Interval Between Sessions of Electric Stimulation of Denervated Rat Muscle. G. K. Stillwell, and K. G. Wakim. (pp. 95-98; 2 tables)

● Significant retardation of atrophy of denervated skeletal muscle in the rat by electric stimulation requires several bouts of stimulation each day. Kosman, Osborne and Ivy in 1947 suggested that in a clinical situation these several bouts of stimulation might all occur in the same hour while the patient is in the department of physical therapy. In the present study, the sciatic nerve of rats was sectioned on one side, and the work output and weight of the gastrocnemius, plantaris and anterior tibial muscles were observed. Stimulation was given for one minute by means of a constant current stimulator with a frequency of stimuli of 16 impulses per second. Those muscles stimulated for one minute four times in one hour each day showed better work output and endurance than did those stimulated for one minute four times in each day; the work output and endurance of the latter muscles were not much different from those of the denervated unstimulated controls. The differences in weights of the denervated muscles in the different groups were small.

Requests for reprints and/or information should be directed to: G. Keith Stillwell, M.D., Mayo Clinic, Rochester, Minn.

Action Potentials from Single Motor Units in Human Muscle. H. Fleck. (pp. 99-107; 6 figures)

● This paper attempts to analyze experimentally the fusion potential of a single human motor unit. To this end the various types of electrode are presented and their parameters are discussed. Two new types of electrode are introduced. With the conventional coaxial electrode, mutation of the potential's configuration is shown to occur on rotation of the needle. This demonstrates that some of the records found in the literature are due to rotation or skewed position of the recording surface with respect to the course of the muscle fibers. A quadriphasic potential was obtained with the "differential" electrode and two such potentials with the "double differential" electrode. The possible uses of such electrodes are discussed in the differential diagnosis of neuromuscular disorders. Standardization of electrodes to facilitate communication between research workers is advocated, as well as the proper care of the electrodes as precision tools in the study of dynamic events in the muscle.

Requests for reprints and/or information should be directed to: Henry Fleck, M.D., 1777 Grand Concourse, New York 53, N. Y.

The Physiologic Basis of Tone, Spasticity and Rigidity. R. Herman. (pp. 108-114)

● The stretch reflex is the result of the following five basic interrelated phenomena: (1) facilitation from the annulospiral endings of the nuclear bag; (2) tonic discharges along the gamma efferent fibers biasing the spindle and the effective reticular formation that moderates these discharges; (3) inhibition from the myotube endings on the extensor groups associated with activation of the antagonistic flexor group; (4) inhibition from the Golgi tendon apparatus via disynaptic pathway, and (5) damping of motor neuron discharges by

the Renshaw negative feedback system. Clinical manifestations of either spasticity or rigidity can be accounted for by imbalances in the integrated system just described. The influence of the gamma bias on the spindle is the most frequent factor in hypertonicity. Postural tone is maintained by an alpha-gamma linkage ("servo loop pathway"). The suprasegmental control of this associative pattern is derived from the anterior lobe of the cerebellum, which acts on the spinal cord by way of the reticular formation. Lesions involving the anterior lobe may produce dissociation of alpha and gamma pathways, with the alpha fiber pathways predominating (alpha rigidity). Occlusion of the motor neuron pool limits all activity at the segmental level. Therapeutic approaches to spasticity directed at decreasing the activity of the fusimotor system would appear rational in the light of this knowledge. Recent experience with injections of procaine hydrochloride has been encouraging in this respect. The ineffectiveness of prevailing methods of therapy for spasticity is discussed.

Requests for reprints and/or information should be directed to: Richard Herman, M.D., Department of Rehabilitation Medicine, Albert Einstein College of Medicine, New York 61, N.Y.

Electromyographic Investigation of the Intercostal Muscles During Speech. M. Hoshiko. (pp. 115-119; 1 figure)

● Electromyographic investigation of the intercostal muscles indicated that both internal and external intercostal muscles are active during speech. The same pattern was found during phonation on inhalation. Stetson's concept of syllable release and arrest by the internal and external intercostal muscles respectively could not be supported. Possibly the arrest may occur at a higher level, or speech may be the resultant of synergistic action of both intercostal muscles.

Requests for reprints and/or information should be directed to: Michael Hoshiko, Ph.D., Assistant Professor, Department of Speech Correction, Southern Illinois University, Carbondale, Ill.

Special Device: Hydraulic Lift for Cervical Traktion. J. L. Rudd. (p. 120; 1 figure)

● The use of a hydraulic lift with an overhead crane to apply cervical traction is described. Because of its simplicity, directed pull, safety and increased over-all effectiveness, it is preferred to equipment of the older type by both physician and therapist.

Requests for reprints and/or information should be directed to: J. L. Rudd, M.D., Chief, Physical Medicine and Rehabilitation Service, VA Out-patient Clinic, 17 Court St., Boston 8, Mass.

APRIL

Psychologic Factors in Rehabilitation of Paraplegic Patients. A. D. Mueller. (pp. 151-159)

● Because of the importance of psychologic factors in rehabilitation of paraplegic patients, a review of observations on this subject is presented. The initial reaction of the person transformed from a state of independence to one of almost helpless dependence may be one of depression, dependency, autistic thinking or frustration. Between three and six months after injury the patient's pretraumatic personality is likely to assert itself, as his thoughts return to the problems of living. Patients whose pretraumatic personality was adequate usually adjust better to the new conditions of life than do those whose pretraumatic adjustment already was inadequate. Adjustments to physical disabilities and to social, economic and vocational problems are reviewed, so that persons concerned with rehabilitation can help the patient to overcome wishful thinking about recovery, occupational plans and home and community living and to look forward not to the protection of the hospital but to an independent life in the outside community.

Requests for reprints and/or information should be directed to: Alfred D. Mueller, Ph.D., Chief Psychology Service, VA Medical Teaching Group Hospital, Park Avenue and Getwell Street, Memphis 15, Tenn.

Motor Nerve Conduction Velocity in Premature Infants. D. Cerra, and E. W. Johnson. (pp. 160-164; 1 table)

● Motor nerve conduction velocity was determined in 17 peroneal nerves and 19 ulnar nerves of 11 premature infants of varying weights and gestational periods. The results indicated a correlation between the weight of the infant, and thus presumably the degree of maturity, and the conduction velocity.

Requests for reprints and/or information should be directed to: Domingo Cerra, M.D., The Ohio State University Health Center, 410 West 10th Ave., Columbus 10, Ohio.

Kinesiology of Selected Muscles Acting on the Wrist: Electromyographic Study. G. B. McFarland, Jr.; U. L. Krusen, and H. T. Weathersby. (pp. 165-171; 9 figures)

● The movements of the wrist were studied with the multichannel electromyograph and electrogoniometer. The electromyograph used was the 8 channel Gilson model. One channel was used for each of the following muscles: extensor carpi radialis longus, extensor carpi radialis brevis, extensor digitorum communis, extensor carpi ulnaris, flexor carpi ulnaris, flexor digitorum superficialis and flexor carpi radialis. The eighth channel was used for an electrogoniometer designed by Francis Andries of Texas Instruments Incorporated as a modification of the one described by Karpovich and associates. The electrodes were monopolar intramuscular nylon-coated wire 0.0011 inch in diameter, developed by Long and associates. The movements studied were flexion, extension and radial and ulnar deviation, with and without elimination of gravity. Preliminary studies indicated the phasic interaction and the part that these muscles play in stabilization.

Requests for reprints and/or information should be directed to: G. B. McFarland, Jr., M.D., Department of Physical Medicine and Anatomy, University of Texas Southwestern Medical School, Dallas, Tex.

Problems in Measurement and Evaluation of Rehabilitation. H. R. Kelman, and A. Willner. (pp. 172-181; 5 tables)

● The problems in measuring and evaluating the results of rehabilitative treatment are reviewed. The problems of choosing criteria and of assessing functional abilities as behavioral manifestations and not merely physical states are discussed, and the results of three objective methods of scoring patients on their performance of the activities of daily living are compared. The authors conclude that the development of precise tools of measurement of the success of rehabilitative measures rests on improvement in the differentiation of the physiologic structural substrate of self-care processes from the mediating psychologic and social influences. They state that further research is needed to shed light on the relation and meaning of differences in performance in test and nontest situations.

Requests for reprints and/or information should be directed to: Howard R. Kelman, Ph.D., New York Medical College, Flower & Fifth Avenue Hospitals, Fifth Avenue and 166th Street, New York 29, N.Y.

Effect of Ultrasound on the Lumbar Sympathetic Nerves. K. P. Schroeder. (pp. 182-185; 4 tables)

● The effect of ultrasound on the lumbar sympathetic nerves has been studied, on the theory that, if it inhibited the sympathetic ganglia, it might have some value in predicting the success of lumbar sympathectomy in increasing the flow of blood to an ischemic lower extremity. In the experiment reported, either sufficient energy could not be applied to penetrate to a great enough depth; the ganglia were missed, or the sympathetic chain was not blocked by ultrasound. It was suggested that the results might differ if experiments were conducted at increased room temperature. Three patients in the group studied subsequently underwent lumbar sympathectomy. There was no correlation between results of this procedure and effects of ultrasound in these.

Requests for reprints and/or information should be directed to: Kenneth P. Schroeder, M.D., 7836 N. Highview Dr., Milwaukee 23, Wis.

Serving America's Disabled: The Great Mission of the Sister Elizabeth Kenny Foundation. H. H. Humphrey. (pp. 186-190)

SPEECH
OF
HON. HUBERT H. HUMPHREY

OF MINNESOTA
IN THE SENATE OF THE UNITED STATES
Wednesday, August 9, 1961

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New Elastic Shrinker for Amputation Stumps. S. J. Liao, and A. Schnell. (pp. 191-192; 2 figures)

• A new device for shrinking amputation stumps before application of a prosthesis is described. This is particularly helpful for elderly amputees, who find the use and adjustment of the elastic ace bandage and the elastic stump sock difficult. The device consists of a strip of heavy gore web elastic and an abdominal belt to hold it in place. It can be left on day and night and adjusted easily even by elderly patients.

Requests for reprints and/or information should be directed to: Sung J. Liao, M.D., Department of Physical Medicine and Rehabilitation, Waterbury Hospital, Waterbury 8, Conn.

Education and Training of Medical and Non-Medical Personnel in Physical Medicine and Rehabilitation. B. Strandberg; K. Jespersen, and B. Sury. (pp. 193-208; 2 tables)

• This study is the result of answers to questionnaires sent to the 20 member-countries of the International Federation of Physical Medicine. Sixteen of the countries answered and, in addition, information was gathered from two non-member countries. The purpose of the study is to find out the contents of the specialty of physical medicine in different countries and to learn if there are common denominators for the education on which to build. Tables are presented showing answers to the questions; the varying extent and completeness of the replies resulted in a wide dispersion of the material and made it impossible to present statistically.

Requests for reprints and/or information should be directed to: Dr. Brynjulf Strandberg, Department of Physical Medicine, Rheumatism and Rehabilitation, Copenhagen County Hospital, Hellerup, Denmark.

MAY

A Second Look: Eleventh John Stanley Coulter Memorial Lecture. D. L. Rose. (pp. 209-213)

• The author discusses the progress of physical medicine as a specialty in the prewar and postwar periods, and suggests that ACPMR members take a second look at the direction of present progress. The need to identify the specialty with treatment of patients instead of devices and techniques is underscored, as are the intra-professional relations of physiatrists with other physicians and the names used for the specialty and its members.

Requests for reprints and/or information should be directed to: Donald L. Rose, M.D., University of Kansas Medical Center, 39th and Rainbow Blvd., Kansas City, Kans.

Effectiveness of Cervical Traction in Treatment of Neck Problems: Evaluation

of Various Methods. J. W. Caldwell, and E. M. Krusen. (pp. 214-221; 8 figures and 1 table)

• This study compares different methods of traction used in the treatment of neck problems. Heat, massage and exercises were held constant, and the type of traction was varied. Results of bed traction, a modification of Hanflings technic, motorized intermittent traction and treatment without traction are presented, as well as the effects of certain medicaments.

Requests for reprints and/or information should be directed to: James W. Caldwell, M.D., Department of Physical Medicine and Rehabilitation, Baylor University Medical Center, Dallas, Texas.

Considerations on Appraisal of Physical Fitness. D. Cardus; U. C. Luft; W. A. Spencer, and H. E. Hoff. (pp. 222-227; 4 figures)

• A review of the investigations done up to date shows that estimations of human physical fitness inescapably refer to a specific task. It is then apparent that, if comparable measurements have to be made on different persons, this task has to be defined, and the methods utilized in obtaining quantitative data have to be standardized. Controlled muscular work requiring a minimum of skill permits the description of the concepts of physical condition and physical working capacity of a person. Physiologic measurements to make objective the expression of these concepts must afford criteria for medical appraisal of the physical condition of acutely or chronically disabled persons in the course of a disease and in the process of rehabilitation. Such measurements also would permit matching human working capacity with industrial or military demands, and would prepare man for the probable challenge of having to face the problem of his own adaptation to possible new environments. It is also of great interest that differences in biologic endowment and the effects of industrial automation, training and recreation can be determined. A discussion concerning the concepts and the selection and difficulties of the methods to be used seems pertinent at this stage of the problem.

Requests for reprints and/or information should be directed to: David Cardus, M.D., Texas Institute for Rehabilitation and Research, 1333 Moursund Ave., Houston 25, Texas.

Five Stage Test of Cardiac Performance During Occupational Activity. F. J. Kottke; W. G. Kubicek; M. E. Olson; R. H. Hastings, and K. Quast. (pp. 228-234; 4 figures and 2 tables)

• A five stage standardized work test has been developed to provide reference conditions under which cardiac performance can be assessed. The levels of activity selected were (1) supine basal rest, (2) sitting rest, (3) hand activities increasing cardiac work to 125 per cent of the basal output, (4) bilateral arm activities increasing cardiac work to 200 per cent of the basal level and (5) activities increasing cardiac work to 300 per cent of the basal amount. The changes in cardiac parameters, including oxygen consumption, pulse rate, arteriovenous oxygen difference, effective arterial blood pressure, electrocardiogram, cardiac output and cardiac work rate, in response to these activities, were studied for 6 normal young men. The stages of the test cover the energy range within which most vocational activities are performed and provide a basis for a test of cardiac competence for a return to work.

Requests for reprints and/or information should be directed to: Frederic J. Kottke, M.D., Department of Physical Medicine and Rehabilitation, University of Minnesota Medical School, Minneapolis 14, Minn.

Simultaneous Use of Heat and Cold in Treatment of Muscle Spasms. R. L. Don-Tigny, and K. W. Sheldon. (pp. 235-237)

• Local application of heat acts to relax muscles generally throughout the skeletal system, at the same time lowering the threshold of muscle spindles locally. The hyperactive muscle spindles may become elec-

tronyographically silent during application of heat, but a minimal amount of either voluntary motion or passive exercise will cause these muscles to return to their spastic state. Local application of cold raises the threshold of muscle spindles, and prolongs relaxation even when exercise follows. If the patient becomes chilled during cold packing, he may shiver and increase existing spasm. The application of cold packs directly to the involved muscles simultaneously with heat to an uninvolved section of the body, to maintain core temperature and prevent shivering, has proved to be an effective method of relaxing muscle spasm.

Requests for reprints and/or information should be directed to: Richard L. DonTigny, R.P.T., Northern Pacific Hospital, Missoula, Mont.

Critique of Rehabilitative Techniques in Treatment of Cerebral Palsy. L. T. Taft; E. F. Delagi; O. L. Wilkie, and A. S. Abramson. (pp. 238-243)

• The rehabilitative techniques used in treatment of patients with cerebral palsy are reviewed from the standpoint of neurophysiologic concepts. The subject is controversial because experimental evidence is scanty, superimposed theory abundant, treatment empiric and results impressionistic. Yet favorable results occasionally seem to occur. Because the residual nervous system of every patient is anatomically and physiologically different and differs in functional capacity, all methods of treatment may have value at one time or another. None can be all things to all patients. Clinical evaluation of methods will improve when attention to motor disability is decreased and attention to sensory and motor interdependence in voluntary movement is increased. Empiricism must be replaced by scientific knowledge.

Requests for reprints and/or information should be directed to: Arthur S. Abramson, M.D., Department of Rehabilitation Medicine, Albert Einstein College of Medicine, Yeshiva University, Eastchester Rd. and Morris Park Ave., New York 61, N. Y.

Study of Conduction Delay in Median Nerve of Patients with Rheumatoid Arthritis. R. M. Wells, and E. W. Johnson. (pp. 244-248; 3 figures)

• Authorities have suggested that compression of the median nerve in the carpal tunnel is a frequent occurrence with rheumatoid arthritis with involvement of the wrist. Although we have been searching our patients for this syndrome, we have been disappointed. To test the hypothesis that rheumatoid involvement of the wrist does not alter along the median nerve at the carpal ligament, this study was undertaken. Twenty-nine patients with rheumatoid arthritis and clinical involvement of the wrist were investigated by the ninhydrin sweat test of the digits and the determination of the conduction delay in the median nerve at the wrist. There was remarkably little difference in conduction delay between these patients and subjects of this same age group without rheumatoid arthritis. Correlation between the conduction delay and the sedimentation rate, age and sex was also unrewarding. It was concluded that rheumatoid arthritis is not a common cause of carpal tunnel syndrome, in spite of obvious involvement of the wrist.

Requests for reprints and/or information should be directed to: Robert M. Wells, M.D., Division of Physical Medicine and Rehabilitation, Department of Medicine, Ohio State University, 410 W. 19th Ave., Columbus 19, Ohio.

Electrodiagnosis and Electromyography in Two Unusual Clinical Syndromes (Glomus Tumor of Common Peroneal Nerve and Vasculitis of Thoracolumbar Portion of the Spinal Cord). H. Wing, and L. Leavitt. (pp. 249-253; 7 figures)

• The authors discuss some electrodiagnostic observations in two unusual clinical syndromes because of their interest to specialists in physical medicine and rehabilitation, and correlate the electrodiagnostic and electromyographic observations with the pathologic picture. A case of glomus tumor of the right common peroneal nerve and one of vasculitis of the thoracolumbar portion of the spinal cord are presented.

Requests for reprints and/or information should

be directed to: Herman Wing, M.D., Medical Director, Rehabilitation Center, University of Louisville School of Medicine, 340 E. Madison St., Louisville 2, Ky.

Prosthetics, Orthotics and Devices: Modified Prosthesis Compensating for Above-Knee Amputation with Fixed Hip Contracture. M. M. Freed. (pp. 254-255; 3 figures)

• A prosthesis compensating for above-knee amputation with fixed hip contracture is described. The advantage of this adaptation is that it permits the patient to perform those activities which ordinarily demand hip flexion, such as sitting, bending forward and getting into and out of an automobile, despite fixation of the hip joint. The ease of fabrication permits the use of a conventional prosthesis with a relatively easy adaptation.

Requests for reprints and/or information should be directed to: Murray M. Freed, M.D., Department of Rehabilitation Medicine, Boston University, Massachusetts Memorial Hospital Medical Center, 750 Harrison Ave., Boston 18, Mass.

Prosthetics, Orthotics and Devices: Clamp Device for Emptying Urinal Bag. L. H. Slette, and F. J. Kotke. (pp. 256-258; 3 figures)

• A device for increasing the independence of patients confined to a wheelchair and requiring a urinal bag is described. The cost of materials is minimal, and only standard tools are required in construction.

Requests for reprints and/or information should be directed to: Frederic J. Kotke, M.D., Department of Physical Medicine and Rehabilitation, University of Minnesota Medical School, Minneapolis 14, Minn.

Prosthetics, Orthotics and Devices: Perineal Hygiene for the Handicapped: A New Method of Self Help. M. B. Brooks, and P. L. Rossman. (pp. 258-259; 1 figure)

• A device which allows handicapped persons to cleanse the perineal area without use of the hands, paper or other aids is described. Not only does it lessen the patients dependence on others in a private matter, but it lessens the burden for nursing and other aids who must assist him. Even when the patient cannot operate the controls for himself, the attendant can do this for him easily.

Requests for reprints and/or information should be directed to: Phillip L. Rossman, M.D., 1441 Westwood Blvd., Los Angeles 24, Calif.

Prosthetics, Orthotics and Devices: Reciprocating Ski Skates for a Patient with Multiple Paralyses. P. Harbine; N. Stael; E. E. Clark, and J. A. Evert. (pp. 260-261; 2 figures)

• A new type of ski skates, described in this article, is a modification of conventional reciprocating skis designed to minimize friction, yet maintain stability during ambulation. This device has solved difficult gait problems for a patient whose weakness and poor balance prevented the use of all standard ambulatory aids.

Requests for reprints and/or information should be directed to: Patrick E. Harbine, R.P.T., Sioux Valley Hospital, Sioux Falls, South Dakota.

Clinical Note: Spasm of the Sacrospinalis Muscle and Lumbosacral Disability. I. M. Siegel. (pp. 262-263; 2 figures)

• When the lower part of the back is normal, the sacrospinalis muscle on one side is in action, elevating the pelvis, when weight is borne on the opposite lower extremity. The muscle on the side of weight bearing is relaxed. In contrast, in the presence of lumbosacral disability, the sacrospinalis muscle of each side is in spasm during weight bearing on both lower extremities as well as on each. Palpation of the lower part of the back while the patient shifts weight from one leg to the other shows

the extent of this spasm, and may be helpful in determining the progress of patients with lumbosacral disability, as well as in detecting malingering.

Requests for reprints and/or information should be directed to: Irwin M. Siegel, M.D., Strauss Surgical Group, 4640 Marine Dr., Chicago 40, Ill.

JUNE

The Effect of the Proposed King-Anderson Bill on Medical Practice. B. P. Harrison. (pp. 269-275)

• The pros and cons of the King-Anderson bill for providing care for aged persons under the Social Security program are discussed, in the light of experience reported from other countries with such programs. The arguments of both proponents and opponents, as presented before the House Ways and Means Committee, are weighed. The conclusion is drawn that present provisions for caring for the aged, including the Kerr-Mills bill, private insurance programs and family and community help, offer a better answer than the "big government" proposal, for which the arguments are largely emotional.

Requests for reprints and/or information should be directed to: Bernard P. Harrison, J.D., Legislative Attorney, American Medical Association, 535 N. Dearborn St., Chicago 10, Ill.

Electrodiagnostic and Electromyographic Studies of Amyotrophic Lateral Sclerosis. N. B. Dobin; A. J. Arieff, and E. L. Tigay. (pp. 276-277; 1 table)

• We have analyzed electrodiagnostic and electromyographic abnormalities indicative of lower motor neuron disease in a group of patients with amyotrophic lateral sclerosis. It is our conclusion that a battery of electrical tests, as used in these cases, gives a better picture of the electrical abnormalities of a muscle with respect to its state of innervation than does any one test.

Requests for reprints and/or information should be directed to: Eli L. Tigay, M.D., Chief, Neurology Service, VA Hospital, Hines, Ill.

Electrodiagnosis and Electromyography in the Study of Progressive Muscular Atrophy. N. B. Dobin; A. J. Arieff, and E. L. Tigay. (pp. 278-279; 1 table)

• We have analyzed the electrodiagnostic and electromyographic abnormalities of a group of patients with progressive muscular atrophy. It is our impression that an entire battery of electrical tests, consisting of galvanic stimulation, faradic stimulation and electromyographic studies, furnishes a better picture of the electrical abnormality of the muscle with respect of its state of innervation than does any one individual examination.

Requests for reprints and/or information should be directed to: Eli L. Tigay, M.D., Chief Neurology Service, VA Hospital, Hines, Ill.

Vocational Status Following Chemopallidectomy and Thalamectomy for Parkinsonism: II. Surgical Treatment in Prevention of Increased Disability. M. Riklan. (pp. 280-283)

• Fifty-seven patients with Parkinson's disease who were judged to have essentially mild and unilateral symptoms responded to questionnaires mailed to them from four months to six years after chemosurgical treatment. Among this group were 39 men. An analysis of the preoperative and long range postoperative vocational status of the group indicates that they had been able to maintain their vocational status for the most part. Approximately as many patients as were working preoperatively were found to be working an average of two years postoperatively. For the most part their jobs were identical or similar to those they held before operation. This finding tends to uphold the hypothesis that, in appropriately selected cases, chemosurgical measures, combined with adequate postoperative rehabilitation techniques, may serve to prevent vocational deterioration. Moreover, it is suggested that the vocational situation of the male patient might be a factor in deciding the ap-

propriate time for surgical treatment of Parkinson's disease.

Requests for reprints and/or information should be directed to: Manuel Riklan, Ph.D., Chief Psychological and Vocational Services, St. Barnabas Hospital, 183rd Street and Third Avenue, New York 57, N. Y.

Incidence of Injury in Muscles Undergoing Maximum Isometric Contraction Without Warm-Up. K. B. Start. (pp. 284-286)

• The widely held theory that warm-up reduces the incidence of athletic injuries is challenged on the basis of observations collected incidentally during a survey of maximum strength of the extensor groups of muscles across the three main joints of the lower limb. While the psychologic and physiologic effect of warm-up on the level of performance may be profound, its efficiency preventing injury appears to be dubious. Investigation directed to this question now seems called for.

Requests for reprints and/or information should be directed to: K. B. Start, Faculty of Education, University of Western Australia, Nedlands, Western Australia.

Trends in Community Programs for Children with Chronic Disease. H. M. Wallace. (pp. 287-292)

• This paper attempts to describe briefly some of the trends in the care of children with chronic disease. Much progress has been made in rehabilitation of these children since World War II, really a brief period of only fifteen years. Much has had to be done on a "trial and error" basis. Now that society has had the benefit of these efforts, further experimentation would appear to be timely.

Requests for reprints and/or information should be directed to: Helen M. Wallace, M.D., University of California School of Public Health, Berkeley, California.

Rehabilitation After Amputation of an Upper Extremity: A Ten Year Study. A. L. Watkins, and D. E. Ford. (pp. 293-296; 4 tables)

• In ten years' experience in rehabilitation of patients who have undergone amputation of an upper extremity, including prosthetic service, approximately 150 were seen in the outpatient rehabilitation clinic. This included 19 patients under 10 years of age, usually with congenital amputation. Male patients outnumbered female by 5 to 1. Among patients over 10, the most common cause of amputation was trauma. All kinds of amputation sites were seen, and 3 patients had undergone bilateral amputation. Information concerning terminal devices and the use of prostheses in work and at home is summarized. Experience in problems of training patients to use a prosthesis and psychologic adjustment to its use are discussed.

Requests for reprints and/or information should be directed to: Arthur L. Watkins, M.D., Chief, Physical Medicine, Massachusetts General Hospital, Boston 14, Mass.

Late Survival Following Cerebrovascular Accidents. C. M. Wyllie. (pp. 297-300; 3 tables)

• Community programs to rehabilitate survivors of cerebrovascular lesions are more effective when they concentrate on patients with the best expectation of life. Of 294 patients admitted to Montebello Chronic Disease Hospital after cerebrovascular accidents, better chances of survival were associated with the following characteristics: age below 55, white race, minimal disability, diastolic blood pressure of 100 or less and a normal electrocardiogram. In this study, factors not clearly associated with chance of survival were sex and side of disability.

In assigning priority for rehabilitation, maximum weight probably should be given to youth and mildness of disability, since these factors are associated with both good potential for rehabilitation and good expectation of life.

Requests for reprints and/or information should be directed to: Charles M. Wyllie, M.D., School of

Hygiene and Public Health. The Johns Hopkins University, 615 N. Wolfe St., Baltimore 5, Md.

Prosthetics, Orthetics and Devices: Use of Vital Body Function to Produce Power for Prosthetic and Orthotic Devices. A. J. Heather, and T. A. Smith. (pp. 301-303; 2 figures)

● A preliminary report of studies now being conducted is presented. Also described and illustrated is the test apparatus used to measure available forces at the cardiac apex. These forces, we have found, can be harnessed as a source of external power, which has application not only in the fields of prosthetics and orthotics but in medicine and other allied sciences. A full report of this project will be made at a later date, and will include more detailed information about the micro-pump and miniaturized hydraulic systems.

Requests for reprints and/or information should be directed to: Arthur J. Heather, M.D., Medical Director, Eugene duPont Rehabilitation Center, 3506 Kennett Pike, Wilmington 6, Delaware.

JULY

Results of Language Tests of Patients with Hemiplegia. M. E. Knapp. (pp. 317-320; 2 tables)

● An attempt has been made to correlate the results of the Minnesota Test for Differential Diagnosis of Aphasia with physical function of patients with right, left and bilateral hemiplegia, to determine the possible value of this test in predicting end results of treatment. The range of errors in each group was so great that it was concluded that the test is not suitable for predicting physical recovery.

Requests for reprints and/or information should be directed to: Miland E. Knapp, M.D., Kenny Rehabilitation Institute, 1800 Chicago Ave., Minneapolis 4, Minn.

A Behavioral Test of Activation Theory for Hemiplegic Patients. C. Casella. (pp. 321-323; 1 table)

● Lindsley's theory that either high or low activation limits the efficiency of human activity has been tested on patients who had suffered cerebral vascular accident, followed by hemiplegia. Their response to efforts at rehabilitation was correlated with their level of activation via anxiety. Statistically significant variations in the improvement of patients with high, moderate and low anxiety was observed in four of the six functions graded. Though patients with high anxiety did better than those with low anxiety, patients with moderate anxiety appeared to have optimum motivation, which could be constructively used to attain the aims of rehabilitation. Because of other factors, the effort to motivate the patient and manipulate his anxieties to a constructive end for purposes of rehabilitation is not simple, however.

Requests for reprints and/or information should be directed to: Carmine Casella, Staff Psychologist, Department of Physical Medicine and Rehabilitation, Elmhurst General Hospital, Queens, N. Y.

Assessment of Intellectual Potential of Persons with Hemiplegia. S. L. Fink, and C. E. Hallenbeck. (pp. 324-331)

● The present paper attempts to relate several issues of current concern in the assessment of intellectual potential. Its purpose is to show that the evaluation of the effects of brain damage is an extremely complex problem involving certain factors the relevance of which may not be readily apparent. First, the general question of evaluating the effects of brain damage is discussed; then, a conceptual scheme is presented for classifying the basic factors involved in the process of evaluation (with special reference to hemiplegia); third, the question of the decline of intelligence with age is discussed in relation to the effects of hemiplegia; and, finally, the issue of return of function is considered in the context of a theoretic model of intelligence.

Requests for reprints and/or information should be directed to: Stephen L. Fink, Ph.D., Chief

Psychologist, Highland View Hospital, 3901 Ireland Drive, Cleveland 22, Ohio.

Rehabilitation in Pulmonary Tuberculosis: Ten Years' Experience. M. W. Lambie, and K. A. Dening. (pp. 332-337)

● Since 1952 the great majority of patients with pulmonary tuberculosis at Sunmount have been liberally treated with assigned work activity, and referred on discharge for full time ordinary work. We have here stated the therapeutic dividends of work in terms which can be applied as well to patients with other chronic illnesses. The hospital's close, simple, productive and perhaps unique relation with the New York State Employment Service is described.

Requests for reprints and/or information should be directed to: Morris W. Lambie, M.D., Chief, Physical Medicine and Rehabilitation Service, Sunmount VA Hospital, Tupper Lake, N. Y.

Prosthetics, Orthetics and Devices: An Adaptive Device for Temporary Above-Knee Prosthesis. H. Wolfson; G. H. Hassard; J. J. Arena, and C. Weaver. (pp. 338-340; 3 figures)

● An adaptation of the Hosmer temporary above-knee walking leg prototype prosthesis, which improves knee-lock action, is described. A suggestion by an alert patient was responsible for an improvement in the adaptation, which is offered in the hope that further refinements of such appliances will be made in the future.

Requests for reprints and/or information should be directed to: Harold Wolfson, M.D., Baylor University College of Medicine, Houston, Texas.

AUGUST

Rehabilitation's Wave of the Future. R. D. Wright. (pp. 395-400)

● The coordination of rehabilitation and public health is considered, and new trends in the rehabilitation movement are discussed. At the start, public programs were aimed at the neglected disabled, and in most cases the process of rehabilitation still begins more than five years after the onset of disability. The goal must be to move the process as close to the onset of disability as possible, and this means inevitably to move rehabilitation close to the midstream of medical care. The role of the attending physician in cooperation with the vocational counselor and the local health director receives new emphasis, therefore.

Requests for reprints and/or information should be directed to: Robert D. Wright, M.D., Department of Health, Education and Welfare, Public Health Service, Washington 25, D. C.

Late Edema After Muscular Exercise. P. Brendstrup. (pp. 401-405; 1 figure and 1 table)

● It is still a matter of discussion whether prolonged painful alteration of muscle after exercise occurs in the form of fibrosis, and whether the fibrosis results from shortening of the muscle or from intracellular or extracellular edema. Experimental studies of the effects of stimulation and motion on the triceps surge of the rabbit were undertaken, and demonstrated that edema develops in a muscle between six and twenty-four hours after hard work, increases the following day, and disappears within six days. The probable significance of the results of chemical studies is discussed.

Requests for reprints and/or information should be directed to: Dr. Per Brendstrup, Laboratory for the Theory of Gymnastics, University of Copenhagen, Copenhagen, Denmark.

Changes in the Posture of School Children in Finland During the Present Century. S. Tawast-Rancken. (pp. 406-408)

● A posture study in 1906 of 8,350 school children seven to 20 years of age showed straightening of the normal curves of the back in 8.3 per cent of boys and in 16.1 per cent of girls attending elementary school. At secondary schools, 13.3 per cent of the boys and

17.5 per cent of the girls had the same postural defect. Studies made in 1956-59 showed that these faults had increased greatly both in number and in degree. In secondary school children 35 per cent of the boys and 68 per cent of the girls showed these postural defects. The increase in postural defects was 2.6-fold in boys and near four-fold in girls. That the defects were severe was established by the finding that the straightening of the lumbar spine was of such a degree in 7 per cent of the boys and 36 per cent of the girls that a backward curvature had formed in the lumbar region of the back. Errors of posture indicative of weakening of the muscles of the back have increased to an alarming extent during the present century.

Requests for reprints and/or information should be directed to: Dr. Salma Tawast-Rancken, Tchtaankatu 10.C.53, Helsinki, Finland.

Pulmonary Function and Physical Working Capacity of Children Who Have Undergone Amputation of an Upper Extremity. W. M. Fowler, Jr.; L. M. Linde; M. B. Brooks, and M. H. Jones. (pp. 409-413; 1 figure and 3 tables)

• Pulmonary function of 20 children who had undergone amputation of an upper extremity and working capacity of 15 children were measured. Measurements were compared to average values for normal children and expressed in percentage of variation from the expected normal values. In 85 per cent of children, working capacity fell below the ninetieth percentile established for normal California school children. Children with congenital amputations had the greatest variation from the expected values. Vital capacity, maximum breathing capacity and functional residual capacity of all amputees were significantly reduced. A definite trend toward increased abnormality in vital capacity, functional residual capacity, residual volume and total lung capacity was observed with ascending levels of limb loss. This suggested that interference with function of some of the accessory respiratory muscles might be responsible.

Requests for reprints and/or information should be directed to: William M. Fowler, Jr., M.D., Department of Physical Medicine and Rehabilitation, University of California Medical Center, Los Angeles 24, Calif.

Diagnosis of Carpal Tunnel Syndrome. E. W. Johnson; R. M. Wells, and R. J. Duran. (pp. 414-419; 6 figures)

• Complaints of numb, tingling and painful hands are commonly thought of as indicating arthritis. Pressure on the median nerve in the carpal tunnel from a variety of conditions is a frequent cause for these symptoms. Since section of the carpal ligament usually results in relief, it is extremely important to recognize this structural defect early. When the median nerve is stimulated supramaximally proximal to the wrist, the conduction delay to the opponens muscle is usually less than five milliseconds. In carpal tunnel syndrome, this delay is increased. A group of 38 patients with this syndrome and with delays ranging from six to thirteen milliseconds is reported. Clinical and roentgen observations are discussed.

Requests for reprints and/or information should be directed to: Ernest W. Johnson, M.D., Associate Professor, Division of Physical Medicine and Rehabilitation, Department of Medicine, Ohio State University Health Center, Columbus 10, Ohio.

Carpal Tunnel Syndrome—A Review. D. A. Zohn; A. C. Hughes, and K. H. Haase. (pp. 420-425; 2 figures)

• Awareness of the carpal tunnel syndrome as a cause of inflammation of the median nerve may be the chief factor in making the diagnosis. Two cases in which the diagnosis was overlooked stimulated us to review the literature on the subject. A brief review of the various facets of the problem is presented, and an attempt is made to emphasize the common diagnostic signs and pitfalls. The role of the electromyogram as a diagnostic aid is emphasized. It is a useful tool also in helping to evaluate return of function during therapy.

Requests for reprints and/or information should be directed to: Lt. David A. Zohn, M.D., U.S. Naval Hospital, San Diego 34, Calif.

Variations in Increment for Different Muscles with Brief Maximal Exercise. L. R. Sutton, and E. M. Krusen. (pp. 426-431; 8 figures)

• The strengthening of muscles through isotonic brief maximal contraction has been found effective by other investigators. This study compares the use of $\frac{1}{2}$ pound (283.5 Gm.) and $\frac{1}{4}$ pound (566.99 Gm.) increments as the daily weight increase for various muscles, a single repetition of weight being lifted and held for five seconds. Normal subjects and patients with specific disease were studied.

Requests for reprints and/or information should be directed to: Layton R. Sutton, M.D., University of Texas-SWMS, Physical Medicine and Rehabilitation, Dallas 35, Texas.

Prosthetics, Orthotics and Devices: A Total-Bearing Therapeutic Pylon for Below-Knee Amputees. A. D. Anderson, and R. Hurwitz. (pp. 432-433; 2 figures)

• A patellar tendon-bearing pylon for use by below-knee amputees is described. This pylon reduces to a minimum the tendency to rotation and forced hyperextension with heel strike, and the patient's ability to ambulate with it is an important criterion in the decision to prescribe a prosthesis. The only absolute contraindication is sensory deficit, as with diabetic neuropathy.

Requests for reprints and/or information should be directed to: Albert D. Anderson, M.D., Montefiore Hospital, 210th Street and Bainbridge Avenue, Bronx 67, N.Y.

SEPTEMBER

The Independent Private Practice of Physical Medicine and Rehabilitation. H. L. Rudolph. (pp. 442-446)

• The advantages and disadvantages of the private practice of physical medicine are discussed, along with the various types of practice. The advisability of referring patients to other physicians for special services and other aspects of the relation between the physician and other physicians are considered.

Requests for reprints and/or information should be directed to: Herman L. Rudolph, M.D., 400 N. Fifth Avenue, Reading, Pa.

The Physiatrist in a Private Hospital. H. Dinken. (pp. 447-449)

• The private, nonprofit hospital is the setting in which a great many physiatrists practice the specialty of physical medicine and rehabilitation. A variety of special opportunities and problems present themselves in this type of practice. Among those discussed are inter-professional relations, the relation of the physiatrist and the hospital administration, teaching, program and space and financial and contractual arrangements. Proper resolution of the problems presented assures the physiatrist of a stimulating, challenging and profitable environment for the private practice of his specialty.

Requests for reprints and/or information should be directed to: Harold Dinken, M.D., General Rose Memorial Hospital, 1050 Clermont Street, Denver 20, Colo.

Electromyographic Kinesiology of the Hand: Part III. Lumbricalis and Flexor Digitorum Profundus to the Long Finger. C. Long, and M. E. Brown. (pp. 459-460; 8 figures)

• This is the third in a series of reports on an analysis of the extrinsic-intrinsic balance in the normal moving hand. Previous reports have delineated the method used and the results obtained in studies of the extrinsic extensor and the interossei of the long finger. The same method, using simultaneous motion pictures and multichannel ink-written electromyograms, was used in studying the lumbricalis and the flexor digitorum profundus to the long finger. The results

obtained in 18 consecutive normal subjects for the lumbricals and 10 for the flexor digitorum profundus are reported. The lumbricals was noted to be a major participant only in those motions involving extension of the proximal and distal interphalangeal joints or involving the "fixing" of these joints in extension. In this study certain specific differences in behavior between the lumbricals and the interossei were demonstrated. Because of the close anatomic relation between lumbricals and flexor digitorum profundus, activity of the latter is reported separately and in association with lumbrical function. Electromyographically the flexor digitorum profundus behaved as would be expected, its activity coinciding with flexion at the distal interphalangeal joint. In relation to the lumbricals, it had a reciprocal or antagonistic function, each muscle being silent during the action of the other. An hypothesis of the interaction of the muscles so far studied (extrinsic deep flexor and long extensor, intrinsic lumbrical and both interossei) in the long finger is presented.

Requests for reprints and/or information should be directed to: Charles Long, II, M.D., 3901 Ireland Drive, Cleveland 22, Ohio.

Collagen Tissue: Implications of Its Response to Stress in Vitro. M. M. LaBan. (pp. 461-466; 8 figures)

● Canine calcaneal tendon was subjected to stress under physiologic conditions. The preparation was subjected to controlled alterations in stress, temperature and time, and the changes in strain produced by these alterations of environmental factors were compared with the responses of plastic polymers to these same factors. Because of their similarity, an attempt has been made to explain strain response of collagen to stress in terms of the structure and characteristics of plastic polymers. From the data the following observations have been made:

1. Initial small increments of stress produce relatively large responses in strain in collagen tissue. With additional stress, responses in strain are smaller and approximately linear.
2. The tensile strength of the tissue appears related to the length of the tendon and/or the number of times it was subjected to stress before the tissue parted.
3. The initial strain response to stress is elastic-like, and is followed by a time-dependent phase of plastic-like change.
4. The tissue, in conduction in vitro, is an imperfect elastomer. After the release of stress, initial recovery is incomplete.
5. The degree of elastic and plastic recovery appears related to the magnitude of distention. However, with successive equal stresses, elastic recovery is reduced.
6. With elevation of temperature, there are increased increments of strain for equal amounts of stress.

Requests for reprints and/or information should be directed to: Myron M. LaBan, M.D., Department of Physical Medicine and Rehabilitation, University Hospital, Ohio State University, Columbus, Ohio.

Review of Some Aspects of Contemporary Physical Medicine in the U.S.S.R. S. Forster. (pp. 467-473; 1 table)

● A review of the literature on physical medicine in the Soviet Union is presented. The profound impact of the concepts of Pavlov and his followers is evident in Russian physical medicine, as it is in other medical specialties. Application of physical methods is based on the principle of "nervism," under which the leading role in the reactions of the organism to physical stimuli is considered to belong to the cerebral cortex. Their use in the treatment of infectious diseases, diseases of the locomotor apparatus and diseases of the nervous system is described. Gastric and duodenal ulcers and hypertension are considered by Russian scientists to be in the last category, and physical methods of treatment are used.

Requests for reprints and/or information should be directed to: Sigmund Forster, M.D., Kings County Hospital Center, 451 Clarkson Avenue, Brooklyn 3, N. Y.

Prosthetics, Orthotics and Devices: Experience with Patellar Tendon-Bearing Below-Knee Prosthesis with Total Contact Socket. L. E. Wolcott, and G. H. Koepke. (pp. 474-476)

- Results of prescribing the patellar tendon-bearing

below-knee prosthesis with total contact socket in 50 unselected cases of below-knee amputation are reported. Only patients with stumps less than 3 inches (7.62 cm.) long presented problems in fitting and alignment. It is concluded that most of the failures previously reported may be a matter of gait training, since it is impossible to attain optimum alignment during a few trips across the floor of the prosthetic shop.

Requests for reprints and/or information should be directed to: Lester E. Wolcott, M.D., University of Michigan Medical Center, Ann Arbor, Mich.

OCTOBER

Cuffed Tracheotomy Tube vs. Tank Respirometer for Prolonged Artificial Ventilation. P. Safar; B. Berman; E. Diamond; K. Hoffman; W. Holtey; H. Moore, and B. Scoville. (pp. 487-493; 2 figures and 2 tables)

● During the 1960 epidemic of poliomyelitis in Maryland, 24 apneic patients were given respiratory aid with volume-cycled intermittent positive pressure respirators. A routine was established which provided adequate ventilation and prevented major pulmonary complications. The routine included the use of large bore cuffed tracheotomy tubes, humidification, artificial coughing and sighing, changing of position, sterile tracheobronchial aspiration and monitoring of ventilation. Five of the 24 patients died within three months. Two of the 5 deaths could possibly have been prevented. Six of the survivors will require artificial respiration for an indefinite period. In addition, circulatory and respiratory parameters of 4 patients were studied during positive pressure ventilation via tracheotomy and with the tank respirator. Clinical results of tank respiration during previous epidemics are compared with results of positive pressure ventilation via tracheotomy.

Requests for reprints and/or information should be directed to: Peter Safar, M.D., School of Medicine, University of Pittsburgh, Pittsburgh 13, Pa.

Management of Severe Injury of Spinal Cord of Civilians. J. Kurtz, and D. Carroll. (pp. 494-501; 2 tables)

● A study of 27 civilian patients with complete transection of the spinal cord has underscored some of the difficulties in their medical and social management. The early handling of the patient by bystanders at the accident, the unfamiliarity of most physicians with the essentials of early care, the lack of preparedness of hospitals for comprehensive management, the lack of good neurologic nursing care and the severity of disability all conspire to prolong the hospital stay. When maximal hospital benefit has been reached, indecision, inadequate, apathetic or unorganized community resources and poor planning may delay discharge and vocational training or job placement. The suggestion is made that care could be improved if a single hospital in a large city could be designated for the management of such injuries at least through the first several months. Such a hospital would accumulate special equipment and experience. The requirements for such a hospital are outlined.

Requests for reprints and/or information should be directed to: Douglas Carroll, M.D., Baltimore City Hospitals, 4940 Eastern Avenue, Baltimore 24, Md.

A Comparative Evaluation of Temperature Distributions Produced by Microwaves at 2,456 and 900 Megacycles in Geometrically Complex Specimens. J. F. Lehmann; J. A. McMillan; G. D. Brunner, and A. W. Guy. (pp. 502-507; 3 figures and 2 tables)

● The distributions of temperature produced in geometrically complex specimens containing skin, subcutaneous fat, muscle and bone have been studied during exposure to microwaves at frequencies of 2,456 and 900 megacycles. The following results are important from a therapeutic point of view: 1. During exposure to the high frequency, a heating pattern indicative of energy reflection at the muscle-bone interface was observed. This may lead to the development of undesirable hot spots, a hazard that seems to be less pronounced at the low frequency. 2. After exposure to both high and low frequencies, the temperature measurements taken behind the bone were con-

sistently lower than those seen when the bone was replaced by muscle tissue. Also, a comparison of the temperatures developed in front of the bone with those behind the bone showed that the temperatures behind the bone were markedly lower for both frequencies. This would indicate that, in the therapeutic situation, it is necessary to expose the bony structures and joints from all accessible areas in order to effect adequate heating. In a joint exposed from one direction only, the structures at the far side of the bone would not be heated adequately.

Requests for reprints and/or information should be directed to: Justus F. Lehmann, M.D., CC-814 University Hospital, University of Washington, Seattle 5, Wash.

Rehabilitation of the Burned Hand. J. K. Gronley; M. H. Yeakel, and A. E. Grant. (pp. 508-513; 3 figures)

• The hand is involved in a surprisingly high percentage of thermal injuries, and presents a problem in both civilian and military medicine. Approximately 110 severely burned patients are admitted each year to the U. S. Army Surgical Research Unit at Fort Sam Houston. Of this number, 75 per cent have burns involving the hands. Eighty per cent of these patients have burns of both hands, varying from superficial to deep second degree burns, with full thickness destruction of the skin or destruction of tendon and bone. The contractures, deformity and functional impairment caused by the thermal insult pose a problem of tremendous magnitude. The purpose of this paper is to present the methods currently used in the treatment of such burns at this installation, with primary emphasis on the role of physical medicine and rehabilitation in the therapeutic program. Specific techniques in physical and occupational therapy are presented in relation to total patient care. The use and construction of a newly developed fiberglass positioning device for use during the acute, post-grafting and convalescent phases are included.

Requests for reprints and/or information should be directed to: JoAnne K. Gronley, P.T., Brooke General Hospital, Brooke Army Medical Center, Fort Sam Houston, Texas.

Dysfunction in Visual Perception with Hemiplegia: Its Relation to Activities of Daily Living. E. J. Lorenze, and R. Cancro. (pp. 514-517)

• In a previous study of 119 hemiplegic patients, 35 were studied for severity of disturbances of visual perception. Standardized tests of intelligence in conjunction with specific subtests of the Goldstein Scheerer Test of Abstract Behavior were used to determine the presence and severity of the difficulty in visual perception. The incidence was high; only 3 of the 35 patients showed no defect in this respect. The most striking observations in the 7 cases of severe disturbance of visual perception were that patients failed particularly in activities of daily living and that hemiplegia was on the left side. Since the sample of 35 patients was small, no specific conclusions could be drawn statistically as to the relation between problems of visual perception and the functional status of the patient in terms of activities of daily living and ambulation. The present study is an extension of the previous one, with detailed testing of 50 additional patients and correlation of results of psychologic tests in terms of visual perception with success in ambulation and activities of daily living.

Requests for reprints and/or information should be directed to: Edward J. Lorenze, M.D., Winifred Masterson Burke Relief Foundation, White Plains, N. Y.

Changes in Autonomic Functioning in Hemiplegia. H. G. Birch, and R. Steinberg. (pp. 518-524; 3 figures and 6 tables)

• The galvanic skin responsiveness of 41 hemiplegic patients and 10 patients without neurologic damage was studied. Eighteen of the hemiplegic patients were nonresponsive. Failures to respond were not limited to the affected extremities but were quadrilaterally distributed. Failure to give an adequate skin galvanic response was associated with elevated base line resistance of skin, but bore no systematic relation to temperature of skin, pain threshold or systemic arterial blood pressure. The results are discussed in connection with the problems of autonomic representation and of

the relation of galvanic skin responsiveness to adaptive behavior.

Requests for reprints and/or information should be directed to: Herbert G. Birch, M.D., Ph.D., Albert Einstein College of Medicine, Yeshiva University, Eastchester Road and Morris Park Avenue, New York 61, N. Y.

NOVEMBER

Patterns of Breathing of Patients Poliomyelitis and Respiratory Paralysis. G. G. Hirschberg; J. P. Adamson; L. Lewis, and K. J. Robertson. (pp. 529-533; 4 tables)

• Respiratory patterns of 67 patients with poliomyelitis were studied at the Respiratory and Rehabilitation Center, San Leandro, Calif. Electromyographic, pneumographic, fluoroscopic and clinical examinations were used to determine which muscles participated in ventilation. All the patients had diaphragmatic paralysis to a greater or lesser extent. Fourteen had complete paralysis of the diaphragm. With the exception of the 3 most severely involved patients, all used one or more groups of accessory muscles for quiet breathing. Details of the mechanism and effectiveness of breathing of these patients with abdomen, neck and chest muscles are discussed.

Requests for reprints and/or information should be directed to: Gerald G. Hirschberg, M.D., 2435 Webster St., Berkeley 5, Calif.

A Myoelectric System for Training Functional Dissociation of Muscles. G. Weltman; H. Groth, and J. Lyman. (pp. 534-537; 2 figures and 1 table)

• A training device for assisting patients who have undergone amputation of an upper extremity in learning to control the activity of various muscles is described. The record of 1 amputee is compared with the performance of untrained young athletes. It is concluded from results achieved that the training system may have many clinical applications, including alleviation of some types of muscular spasm and retraining of function of available muscles of patients who have had poliomyelitis.

Requests for reprints and/or information should be directed to: Gershon Weltman, Ph.D., Department of Engineering, University of California, Los Angeles 24, Calif.

Heating Patterns Produced in Specimens by Microwaves of the Frequency of 2,456 Megacycles When Applied with the "A", "B" and "C" Directors. J. F. Lehmann; J. A. McMillan; G. D. Brunner, and V. C. Johnston. (pp. 538-546; 15 figures)

• Commercially available equipment operating at a frequency of 2,456 megacycles was used to irradiate specimens of pig thigh of various thicknesses, to determine the distribution of temperature when "A", "B" and "C" directors were used. It is concluded that microwaves of this frequency produce an undesirable amount of heat in the subcutaneous fat, regardless of the beaming properties of the directors. The possibility that this distribution might be modified considerably under therapeutic conditions by such physiologic factors as changes in blood flow remains to be investigated.

Requests for reprints and/or information should be directed to: Justus F. Lehmann, M.D., Department of Physical Medicine and Rehabilitation, CC-814 University Hospital, Seattle 5, Wash.

Accelerographic Study of Gait. W. T. Liberson; H. J. Holmqvist, and A. Halls. (pp. 547-551; 6 figures)

• A method has been developed for simultaneous recording of accelerograms, electromyograms and high speed motion pictures of normal and pathologic gaits. A simple nomenclature is proposed for different waves of the recorded accelerograms, particularly those of the swinging leg. The method has an advantage over the use of force plates, since it permits an analysis not only of stance but of the swing phase. The study of hemiplegic patients and patients with amputation above

the knee revealed characteristic deviations from the normal tracings, and may be helpful in the management of rehabilitative programs for these patients.

Requests for reprints and/or information should be directed to: W. T. Liberson, M.D., Edward Hines Jr. Veterans Administration Hospital, Hines, Ill.

Perception of Space of Adult Hemiplegic Patients. A. J. Ayres. (pp. 552-555; 1 figure and 3 tables)

● The experimental hypothesis of a difference in scores on a space test between 15 right-handed persons with right hemiparesis due to cerebral vascular accident and 16 right-handed persons with left hemiparesis due to cerebral vascular accident has been tested and rejected. Combined scores of patients with right and left hemiplegia formed a bimodal curve, the distribution about one mode falling roughly the same as that of a control group and the distribution about the second mode falling considerably below the first. Approximately two-thirds of all subjects who had sustained cerebral vascular accident showed a deficiency in perception of space.

Requests for reprints and/or information should be directed to: A. Jean Ayres, Ph.D., University of Southern California, University Park, Los Angeles 7, Calif.

Somesthetic Influences on Perception of Visual Verticality in Hemiplegia. H. G. Birch; I. Belmont T. Reilly, and L. Belmont. (pp. 556-560; 5 tables)

● The present study was designed to test the hypothesis that the disturbance of the visual perception of the true upright experienced by hemiplegic persons is caused by somesthetic imbalance. In a completely darkened room, 20 hemiplegic patients and 18 orthopedically handicapped patients without brain damage made twenty judgments of verticality of a luminous rod presented alone and the same number of judgments at a later date when a 10 pound (4.5 Kg.) weight was applied to each of the shoulders. The results obtained indicated that, when somesthetic imbalance is aggravated, there is a worsening of judgment, whereas an increased input to the affected side causes some slight degree of improvement in the capacity to judge the visual upright correctly. The results are discussed in connection with the difference in changes in visual perception experienced when nonhemiplegic persons are stimulated by addition of weight and in relation to developmental theories of visual function.

Requests for reprints and/or information should be directed to: Herbert G. Birch, M.D., Department of Pediatrics, Albert Einstein College of Medicine, Bronx 61, N. Y.

Studies in Emphysema: Long-Term Results of Training in Diaphragmatic Breathing on the Course of Obstructive Emphysema. M. B. Cole; C. Stansky; F. E. Roberts, and S. M. Hargen. (pp. 561-564; 5 figures)

● Thirty-one emphysematous patients have been followed subjectively and objectively by studies of ventilatory function for from twelve to sixteen months. Six of these patients were trained in diaphragmatic breathing, which was the only significant variation in treatment. Comparison of the ventilatory studies on the 25 untrained patients and the 6 trained patients showed no significant differences. Subjective improvement reported by most of the patients in both groups could not be substantiated.

Requests for reprints and/or information should be directed to: Milton B. Cole, M.D., V. A. Center, Bay Pines, Fla.

Effect of Splinting on Reflex Inhibition and Sensorimotor Stimulation in Treatment of Spasticity. N. Kaplan. (pp. 565-569; 1 figure)

● The Bobath's and Reed's techniques are used frequently in the treatment of cerebral palsy and hemiplegia. This study reports an attempt to determine whether prolonged therapy with a dorsal splint will inhibit or diminish hyperreflexia or stretch reflex and at the same time increase muscular power by sensorimotor stimulation. Preliminary trials and attempts with different materials to

find the most appropriate splint and the splint now in use are described. Ten patients with onset of hemiplegia from nine months to thirty years earlier were studied. Preliminary electromyographic study to record spasticity and strength of muscle in the involved extremity was done, and an evaluation of the effect of occupational therapy on function of the hand and wrist was made before the splint was applied. Repeated clinical and objective evaluations were made during the study. Apparent improvement in strength and function of muscle, with decrease in stretch reflex and spasticity, were observed when a dorsal splint was properly applied in treatment of hemiplegia involving an upper extremity.

Requests for reprints and/or information should be directed to: Nathan Kaplan, M.D., Presbyterian Hospital, 622 W. 168th St., New York 32, N. Y.

Prosthetics, Orthotics and Devices: Modified Crutch Handle. W. R. Powers, and A. E. Flatt. (pp. 570-573; 5 figures)

● A modification of the conventional crutch handle to allow direct intrinsic distribution of forces and anatomic alignment between osseous structures of the forearm, wrist and hand is described. The modification is a simple application of known anatomic facts, and makes possible correct posture of the hand during ambulation with crutches.

Requests for reprints and/or information should be directed to: Whitney R. Powers, M.S., Box 62, University of Florida, Gainesville, Fla.

Prosthetics, Orthotics and Devices: Use of Child's Kapok Life Preserver in Reversed Position in Rehabilitation of Children With Pseudohypertrophic Muscular Dystrophy. D. S. Pierce. (pp. 574-575; 1 figure)

● A simple method for facilitating the general rehabilitation of patients suffering from advanced pseudohypertrophic muscular dystrophy is presented. The method is simple, and embodies the use of a child's kapok life preserver of the "Mae West" type, approved by the Coast Guard. This is strapped on the patient in reverse, so the head and neck are supported while a full program of active exercise, including ambulation and respiratory resistive exercises, is carried out in a swimming pool. The method has been used in the treatment of 12 patients at the Rainbow Hospital for Crippled and Convalescent Children, South Euclid, Ohio, with satisfactory results. Further uses of the method are being explored, and it is felt that it should be useful for both children and adults with other crippling diseases of the musculoskeletal system. Extension of the technique to community swimming facilities where programs for crippled children are in existence was begun in the summer of 1960. Early results were gratifying.

Requests for reprints and/or information should be directed to: Donald S. Pierce, M.D., Biomechanics Laboratory, University of California Medical Center, San Francisco 22, Calif.

Prosthetics, Orthotics and Devices: A Device to Help the Tetraplegic Patient Help Himself In and Out of a Wheel Chair. A. E. Comarr, and T. S. Schwenk. (pp. 576-577; 3 figures)

● A self-help device for use in getting in and out of a wheel chair has been created by a tetraplegic former in-patient (T.S.S.). It is an excellent aid for the quadriplegic patient who has sufficient functional ability in shoulders and elbows to use it by himself. With this apparatus the patient does not need a bed helper at home for the bed or couch of standard height. It is helpful to him also when he travels. It could be of considerable value also to the wife or attendant of a tetraplegic patient with extensive functional deficit.

Requests for reprints and/or information should be directed to: A. Estin Comarr, M.D., 4235 Clubhouse Drive, Lakewood, Calif.

DECEMBER

Speech and Hearing—Physical Medicine and Rehabilitation. J. S. Tobis; K. O. John-

son; H. Lillywhite, and F. J. Kottke. (pp. 592-606)

● A discussion of the roles of specialists in speech and hearing disorders and of physiatrists in the rehabilitation of persons with these handicaps was conducted between two persons from each specialty. The efforts of the American Speech and Hearing Association to raise standards in its field are told, and an effort is made by representatives of both specialties to improve understanding, in the interests of the patients they treat.

Requests for reprints and/or information should be directed to: Jerome S. Tobis, M.D., 229 Chestnut Rd., Manhasset, L. I., N. Y.

Dystonia Musculorum Deformans: Neurosurgical Treatment, Rehabilitation and Follow-Up. I. S. Cooper; M. Riklan; A. Abdell, and Z. Laszewski. (pp. 607-614; 5 figures and 3 tables)

● The purpose of this presentation is to review a five year clinical investigation of neurosurgical intervention and rehabilitation of patients with dystonia musculorum deformans. During this time, 30 patients with this condition underwent operation and postoperative rehabilitation. The patients are described in some detail, as is the program of postoperative rehabilitation. Data are presented on the long range outlook for the group. On the basis of follow-up data derived from questionnaires and personal examinations, it is concluded that 76 per cent of patients who undergo this program of operation and rehabilitation experience both symptomatic and functional improvement over a period ranging up to five years. It is clear that in appropriate cases surgical rehabilitation can reverse the neurologic symptoms of dystonia and improve function considerably.

Requests for reprints and/or information should be directed to: Irving S. Cooper, M.D., St. Barnabas Hospital, Third Ave., between 181st and 183rd St., New York 57, N. Y.

Rationale of Manipulation of Joints. R. C. Barbor. (pp. 615-620; 1 table)

● There is more difference of opinion over manipulation than over any other physical treatment. Manipulation is a word used to mean passive movement, forced movement, mobilization or stretching. Manipulation carried out while the patient is anesthetized, as done by orthopedic surgeons, is reputable, but manipulation done on a conscious patient is disreputable in the eyes of the medical profession, because this is the method used by osteopaths and chiropractors. The subject is not taught to the medical student, since the elder statesmen of medicine have not had sufficient experience with the method. Manipulation of the spinal

column, in my opinion, should become an everyday treatment. It is simple to learn and to carry out. The difficulty is in exact diagnosis and exclusion of cases in which the procedure is unsuitable. Detailed examination of the joint is essential, and the uncertain role of roentgenograms in diagnosis requires recognition. The three main uses of manipulation are for stretching out a contracture, breaking an adhesion and reducing internal derangement. The general orthopedic uses, as for reducing dislocations or fractures during anesthesia, are not discussed here. The diagnostic pattern of lesions suitable for treatment is explained. The problem posed by the lesion and the intention of the manipulation are described, along with the influence of these considerations on technique. Finally, the advantages and disadvantages of anesthetizing the patient are discussed, and the use of traction during manipulation and alone are dealt with in relation to the lumbar part of the spine and the cervicothoracic spinal joints. The question remains: Who is the correct person to carry out this type of treatment—physician or physical therapist?

Requests for reprints and/or information should be directed to: Dr. Ronald C. Barbor, 32 Wimpole St., London W. 1, England.

Prognosis for Deficiencies in Speech Accompanying Cerebral Palsy. E. J. Lorenze; M. A. Sokoloff, and R. Cruz. (pp. 621-626)

● In an attempt to determine the prognosis for amelioration of speech deficiencies related to cerebral palsy, a follow-up study of 88 of 192 patients originally studied at the Burke Foundation cerebral palsy clinic was undertaken at intervals ranging from sixty-four to seventy-four months. The data tend to indicate good prognosis for development of adequate speech when delay in development of language is due to emotional disturbance, perceptual disturbances and social retardation and poor prognosis when delay is due to mental retardation, deafness or severe articulatory involvement. Prognosis for significant improvement is good when articulatory disturbances have a functional cause and fair when their cause is organic. Prognosis for some improvement is good for all types of articulatory disturbance. Approximately 1 of 4 children followed in this study after therapy for delay in development of language showed significant improvement. This raises some question as to the advisability of therapy, although disturbances with some specific causes may be more amenable to treatment than those with other causes. We did not have suitable numbers of patients in the specific groups to determine this. Our figures may have been affected by the loss from the follow-up group of patients showing improvement. Continued close contact in the therapeutic situation permits increased understanding of the nature of the language problem and thus aids diagnosis.

Requests for reprints and/or information should be directed to: Edward J. Lorenze, M.D., Winifred Masterson Burke Relief Foundation, White Plains, N. Y.

